



Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

ROAD LEGISLATION FOR THE AMERICAN STATE.

I.

ECONOMIC AND SOCIAL SIGNIFICANCE OF ROADS.

Although in all stages of the world's history the importance of good roads has been recognized by civilized peoples, so much so, in fact, that it is a common saying that the character of a nation's roads is a good test of its civilization, it nevertheless holds true that in most of the highly civilized countries—and in our own most of all—there still remains much to be done to secure good common roads. Americans, who spend much more of their time in riding over country roads than do the inhabitants of Europe, are inclined to speak with unbounded admiration of the magnificent roads of England, Germany, and especially France. It is, however, only since the beginning of this century that those countries have done much toward securing good roads, and their network of roads is yet by no means complete. A glance at the proceedings of the Prussian Landtag shows that many new roads are continually being made, while the publicists deplore the lack of any comprehensive system of roads, or of legislative enactments which will make them to secure such a system.¹ If, good as their roads are, they still need

¹Von Rönne: *Staatsrecht der Preussischen Monarchie*, II. 2, 337. "Der Erlass einer allgemeinen Wege-ordnung ist als ein dringendes Bedürfniss anerkannt, und wird seit dem Jahre 1820 vorbereitet; es ist aber bis jetzt eine solche nicht zu Stande gekommen."

an improved system, how much more do we need one!

The principal reason for this comparative neglect of the common roads in nearly all countries is, of course, to be found in the astonishing growth of the railway systems, and, since the invention of the steamboat, of commerce by water. These have rendered unnecessary long roads such as the ancient Aztecs and Romans found it wise to build for commercial and military purposes. Then, too, though the railroads have not really lessened the importance of the wagon road, they seem to have done so; and they certainly have overshadowed it in political importance, so that legislators, naturally, have passed it by.

That the economists also, attracted by the more interesting political subject, have neglected the common roads,¹ must be my excuse for devoting a few paragraphs to their economic significance, especially with reference to the United States, though the facts are patent to every one.

Governor Ames, of Massachusetts, in his late message to the Legislature, (1889) calls attention to the fact that while we are "dependent upon steam railroads for the carrying of passengers and freight, yet all such passengers and freight have to pass over the

¹Sax: *Verkehrsmittel*, vol. I, p. 20. "Die Literatur der Nationalökonomie hat diesen Punkt ziemlich vernachlässigt." Lorenz von Stein: *Handbuch der Verwaltungslehre*, p. 361. "Die Literatur über das Communicationswesen ist in deren einzelnen Theilen, theils sehr reich (besonders Eisenbahnen), theils sehr arm (Wegewesen)." I do not know of any writer, excepting Sax, that has treated the subject with any degree of fullness. Of course, the works on Administrative Law treat the subject from the legal standpoint and those on Finance from that of taxation, but, as a rule, only a few general remarks touch the economic question.

roads leading to and from the steam roads." Few people, however, have any clear conception of the cost of this transportation by wagons and horses. In the compilation of the statistics of agriculture for the tenth census of the United States (1880) an attempt was made to get a fair estimate of the average cost of hauling grain from the farm to the railway stations. The estimates returned varied greatly—from twenty cents to two dollars, for hauling one hundred bushels one mile—but it seems clear that the average cost of hauling one hundred bushels one mile is sixty cents at least. "In most of the western wheat regions, it is stated that if wheat has to be hauled more than eighteen or twenty miles to reach railroad or water, this land-carriage in ordinary years eats up the profits of culture. According to the estimates received it costs the ordinary farmer more to carry each bushel of wheat a mile than it does the ordinary railroad to carry a ton, and, consequently, when we get west of lake Michigan, it rarely pays to grow wheat more than twenty miles from rail or water transportation."¹ When one thinks of the nearly 500,000,000 bushels of wheat grown yearly, practically all of which, excepting that saved for seed, has to be transported over our roads, a distance of several miles on the average, and then adds to that the more than two billions of bushels of other grains produced yearly, a large proportion of which is so transported, the importance of good roads and the gain arising from building them become manifest. The farmer, too, in our central and older western states should

¹Vol. on *Agriculture, Special Report on the Cereal Production of the World*: p. 153.

reflect that this gain would come largely to him. It would of course not come to the consumer till the roads in the newer parts of the country had also improved.

A very large proportion of our people, too, have never seen a really good road for hauling purposes, and have, in consequence no clear idea of the gain that would come from good roads.

Q. A. Gillmore, author of a "Practical Treatise on Roads, Streets, and Pavements,"¹ shows this gain clearly. "The following table, resulting from trials made with a dynamometer attached to a wagon moving at a slow pace upon a level, gives the force of traction in pounds upon several different kinds of road surface in a fair condition ; the weight of wagon and load being one ton of 2,240 pounds."

1. On best stone trackways.....	12½ lbs.
2. On a good plank road.....	32 to 50 "
3. On a cubical block pavement.....	32 to 33 "
4. On Macadamized road of broken stones.....	65 "
5. On Telford road, made with six inches of broken stone of great hardness, laid on a foundation of large stones set as a pavement.....	46 "
6. On road covered with 6 inches of broken stone laid on concrete foundation.....	46 "
7. On road made with a thick coating of gravel laid on earth.....	140 to 147 "
8. On a common earth road.....	200 "

This table shows us that any one of the better class of permanent roads would enable a team to draw on the level about four times the amount drawn on a common dirt road "in good condition." We need also to consider that our roads for more than half the year are not "in good condition."

¹New York, 1876. A small but very useful handbook.

The State of Illinois may, doubtless, be taken as in this respect fairly representative of the grain producing states. Experienced road commissioners of that state give as a careful judgment that for two-thirds of the year not more than one-half can be hauled of what, in the best seasons, is considered a good load. In a paper read at Springfield, Ill., last spring (1888) at the convention of the Highway Commissioners,¹ it was estimated that for one quarter of the year a good load can be hauled, for another quarter, two-thirds as much, while for the other half-year not more than one-half the first amount can be hauled. If the estimate is a fair one, (and there seems to be no reason for doubting it, if we take the average road, and not alone the best of the dirt roads) it will readily be seen that good roads—even good dirt roads at all seasons—would reduce the cost of transportation on our country roads more than one-half, while a good permanent road would make the real cost of hauling less than one quarter what it is now. This is more clearly seen, if we consider that with permanent roads the farmer might select days for going to market when he could not be profitably employed on the farm, whereas now, with the exception of good sleighing at times in the winter, the days when he cannot profitably work on the farm are those when the roads are most nearly impassable.

Even at the risk of what may seem tiresome iteration, it seems best to attempt fully to realize for ourselves what our poor roads are costing us yearly. To approach the subject from another direction. If the estimate as to the amount that can be hauled at the

¹A paper on "Road Drainage," prepared by Thomas McClanahan of Monmouth, Ill.

various seasons of the year in Illinois be correct, we find that an ordinary draught horse whose earnings may safely be estimated at fifty cents per day, or for three hundred days, one hundred and fifty dollars per year on good roads, would on those poor roads earn but two-thirds as much, say one hundred dollars. If the roads now were to be improved so that for one half the year good loads could be hauled, and for the other half two-thirds as much on the average—no unreasonable supposition—instead of one hundred dollars in three hundred days the horse would be able to earn at the same rates one hundred and twenty-five dollars. Though under such circumstances the rates of hauling would of course vary, so that the horse might not earn so much more money, nevertheless the ratio of one hundred to one hundred and twenty-five dollars fairly represents the increase in productive capacity. The estimate made by Prof. Ely¹ that our poor roads cost the farmer on the average at least fifteen dollars per horse seems from the above consideration a low estimate. At that rate the cost to such a state as Illinois is more than \$15,000,000 per year (\$15,346,230), if we were to consider the horses enumerated as on farms as representative of those used in the State. Of course the number is more than that. In the *Engineering News* of August 18, 1877, Clemens Herschel, a civil engineer of Boston, in comparing our roads with those of England, after a careful statistical study of the different kinds of roads and pavements, says: “The English horse employed in the streets of a city or on the roads of the country, does twice as much work as the Ameri-

can horse similarly employed in America. This is the patent, undeniable fact. The simple explanation is that the Englishman has invested in perfect and permanent roads what the American expends in perishable horses that require to be fed." He expressly denies that the explanation can be found in better horses, or in better treatment of them, or in harder work for them. The only explanation is found in the better roads of England.

From good roads another benefit of not less importance to the farming community would be the increased value of the farms.

Judging from the increased value of all farming lands situated near cities or large towns, if the road to the town is a good one, it is hardly extravagant to say that two-thirds of the good farms in the Mississippi Valley, of which the present value is from forty to fifty dollars an acre, would be increased in value to the extent of ten dollars an acre, if good roads were made by them. A civil engineer, Mr. McClanahan, Monmouth, Ill., an expert road-maker and advocate of tile drainage—perhaps on that account somewhat prejudiced in this direction—says that thorough drainage alone of the prairie roads would make enough difference in them to add fifteen dollars per acre to the value of the best farms in Central Illinois. Of course, the newer land would receive a proportionally greater benefit. When we consider that Illinois alone has nearly 32,000,000 (31,673,645) acres of farming land, estimated in 1880 to be worth on the average about thirty-two dollars an acre, it would seem that if good dirt roads—not to speak of macadamized roads—would add even five dollars per acre to the value of the land (and no

man would question that), the state would do well to take some active measures to secure good dirt roads. \$160,000,000 could hardly be added to the wealth of the state in an easier manner. Similar figures could, of course, be applied to all the grain producing states with a similar showing:

In our country we have rarely considered the relations existing between the railroads and our common roads. The roads have been laid out in the western states along the section lines without reference to the railroads, while the latter have been run through the towns that would be likely to bring the largest custom, or that would offer the largest bonus. If, however, the question should be raised of taxing the railroads for the support of the roads, and the places for the expenditure should be sought, it would soon be noticed that the roads running parallel to the railroads, and connecting towns also joined by the railroad, were of far less importance than those from other directions, and that they also were, to a greater or less extent, competitors of the railroad. Though this is little thought of, it is doubtless true. If we had good permanent roads, freight could often be hauled on wagons ten miles cheaper than it could be taken one mile to the station, unloaded, put on the cars, freight paid, unloaded from cars, put on the wagon and carried to its destination.

Passenger traffic would be affected to a still greater degree. Especially in the pleasant seasons of the year, small excursion parties and business men would use carriages more, and, in consequence, would use the cars less, if the roads were good. These considerations, of course, would not affect people living on roads running across the line of the railroad.

While the direct effect of good roads on the network of railways would not be seen to any noticeable extent probably, it is likely that indirectly the effect would be felt somewhat on the building of new lines. A farmer living six miles from a railway station on a good road is as favorably situated as one on an ordinary western road who lives only four or even three miles from a station. In a decision regarding the gift of the right of way for a new railroad, or a subscription for one, this fact would doubtless have some weight and ought really to carry much force. Whether it would affect the ordinary farmer or the railway managers enough to limit at all the building of roads is a question—very possibly not to a noticeable extent; but there is no doubt that good roads would vastly increase the efficiency of the railroads that we now have so far as concerns their aid to a community; so that the effect would be in reality the same as if it rendered railway building much less necessary, and saved a corresponding amount of capital for investment elsewhere.

The roads running at a right angle to the railways, if the network of railways is not close, should, of course, be in the best condition in order to facilitate the shipment of products. The railways not infrequently recognize this advantage to themselves, a fact seen by offers made to haul gravel at the mere running cost, if it is to be used on the roads. In many cases they might well afford to haul it free or for simply the cost of handling. In Baden, Germany, the relation of the roads to the railway was recognized by striking from the list of state roads all those that ran parallel to the railroad, or that had lost

their importance by its construction, in order to save funds for the support of others; while most of those running across the railroad, if they crossed at stations, so that they served as feeders, were raised to grade of state roads.¹

If the amount of capital invested in roads were really considered by our country people, it would lead to a better use of them. How many of our farmers consider that in many of our fairly well settled farming townships five hundred acres of land, worth, if in farms, \$25,000 or more, are withdrawn from cultivation for road purposes? Add to the value of the land the wealth spent in improvements, and the amount becomes one well worthy of note. If the community fully comprehended the extent of the capital thus invested, the natural spirit of saving, of thrift, would move them to take steps to make this capital as productive as possible, instead of allowing the road to become principally a seed-bed for the distribution of Canada thistles and other noxious weeds over the surrounding cultivated fields.

The influence of good roads upon the prosperity of towns will be discussed more fully in a succeeding section; but it should be noted here that the surrounding market of a town increases with the square of the distance to which goods can be sent at the same price.²

If a town is now the market for a certain amount of wheat, and the roads are so improved that wheat can be drawn twice as far for the same expense, the

¹ *Engineering News*, August 25, 1877.

² Sax : Transport und Communicationswesen, § 3., in Schönberg's *Handbuch der Politischen Oekonomie*.

town would naturally receive—excluding the competition of other towns, as in many parts of the country we might do with justice—four times the quantity received before. It takes no such calculation, simply observation, to show any merchant how much wider his market is in seasons of the year when the roads are good. The farmers, too, get the benefit of the competition thus brought about between rival towns, in the lowering in price of the goods they must buy, with oftentimes an increase in prices for those they sell.

The great saving in capital by the low rates of transportation offered by the railroads, and the consequent employment in other modes of production of the capital thus set free, is often noted. What is true in this regard of the railway is true of the wagon road as well.

The change of methods of farming from an extensive to a more intensive system is often noticeable as a direct result of the improvement of the roads in the neighborhood of cities, grain fields being changed into market gardens with a great increase in their net productive capacity.

Some of these minor economic influences need not be dwelt upon, but a word must be said of the social influence of good country roads. The present strongly marked inclination of our farming population toward the cities, which is so often regretted, would be checked doubtless by an improvement in the condition of the roads. How often do we see our farmers, especially the most prosperous and intelligent ones, who are wise enough to wish to educate their children well, moving to the smaller towns and cities, often only a distance of three or five miles,

because their children cannot otherwise be regular in attendance at school, and secure the advantages of social life. How much better in every way, both for the farmer and for the country at large, could this real need, the recognition of which is highly creditable to the farmer, be met by a good permanent road, that could be traveled with speed and comfort in all weathers and at all seasons! A still greater benefit would doubtless be received by those who are unable to take up their residence in the towns, or who have not the worthy ambition for their children's advancement that would lead them to do so. A large part of the mental inspiration and culture of the farmers depends upon their ability to attend church, lectures, concerts and social gatherings at a distance, and really good roads, by enabling them to go so much more easily, would doubtless raise the whole intellectual tone of the farming community, besides keeping within the healthful influence of the farm many who now are almost forced into the towns.

Those who have noted the effect of a rainy day, or a muddy road, upon attendance at town-meeting, or who heard the defeat of the Republicans in New York state in the presidential election of 1884 ascribed to the bad weather on election day, can readily see the real advantage to political education that would come from good country roads. These seemingly petty considerations assume really great significance, when one considers long periods of time and wide stretches of territory.

II

ROAD LEGISLATION IN THE UNITED STATES.

It seems fit to consider briefly the reasons for our present imperfect system of road legislation, and to give an account of the leading provisions found in most of the states, before entering upon any discussion of the principles of legislation for roads, or any account of foreign systems. We should appreciate first just where we stand. Of course the laws in the different states and territories vary much, but the leading defects are common to most of them.

In the early days of the Republic, the form of highway legislation introduced from England—elective township and district road officers and the labor tax—was better suited to our local conditions than any other. The sparse population would have made any more elaborate system cumbersome and impracticable. The traffic was almost wholly local, and there was no spare capital to be expended in building long thoroughfares. It paid much better to carry on through traffic—mostly the infrequent mails and passengers—by water, or where that was impossible, a mere trail sufficed. When upon the admission to the Union of new states situated inland, the need of better means of communication by land became imperative, the National government, by special appropriations and grants, as early as 1806, when it made provision for the “Cumberland Road,” attempted to meet the requirements. The question of internal improvements, so far as it concerned roads, though a prominent political question especially from 1812 on, turned entirely on the interpretation of the Constitution regarding the powers granted by it—no one, not

even Madison, Monroe and Jackson, though they felt compelled to veto such bills on constitutional grounds, denying the wisdom of appropriations made to build roads. The introduction of the railroads about 1830 lessened the need for the longer wagon roads, and lessened apparently, though not really, the importance of even good local roads, so that roads were dropped from national politics. The minds of our political thinkers have naturally turned toward the attractive field of national politics, and though our changed circumstances have made a radical change in our road legislation probably advisable, little has been done.

Again, though we sometimes pride ourselves on our boldness, our independence in matters of government and legislation, we are on the whole a conservative people, and particularly in local matters we cling to the old forms, often to an unreasonable extent. We pride ourselves on our township system, look upon it as the system that has given us, and preserved for us, our individual liberty, and made our nation what it is; and our country people, especially in New England, look with aversion upon any proposal that tends to lessen the power of the individual voter in town-meeting. A proposal to revise our township road laws consequently meets with opposition, if any material change is proposed. Though our people are getting to have little fear of centralization, so far as the National and State governments are concerned, there is still a clinging to the township and school district, as compared with the larger local subdivisions, that is often harmful.

The true principle of administrative centralization or decentralization, whether we are considering the

relation of the township to the county and state, or that of the state to the national government, is simple: Let each division manage its own affairs. The difficulty arises when we attempt to determine what matters are of national, what of state concern; or again, what of county, what of town concern. To increase the difficulty, we have written laws which have in earlier years declared the relation and application of this principle to the facts and circumstances of that time, to interpret and apply to the facts and circumstances of our own time. The laws are unchanging: the circumstances are continually changing. One result is the often cited fact that the words of the law are oftentimes forced to take on new meanings to fit the new circumstances. But another result more germane to this case is this: Having the unchanging law before our minds continually, we sometimes overlook the fact that the circumstances under which the law was made have changed entirely, and we go on unthinkingly administering and suffering from a law once good and wise, now wasteful and perhaps harmful. When we revise we simply touch details, and do not seek the underlying principle. This neglect of the change of circumstances is particularly noticeable in such matters as the road and school laws, for their administration is not in the hands of skilled men who would be likely to notice defects, and to insist on their removal.

To our early circumstances then; to the comparative lack of interest in local affairs; to the conservative spirit of our people, combined with the influence of the form of the law itself in hindering them from noting the changing circumstances in their relation

to such matters; and to the strong bent of our people toward the retention of local powers, may, in great part, be attributed our present defective system. Of course, local influence and individual legislators have succeeded in making the laws of some states much better than those of others; but we can notice that, with one or two exceptions in the case of the oldest and most progressive states, the newer states have profited by the experience of the older ones, and have made some improvements in legislation, though in most cases much more might yet be done to advantage. [See Tabular Digest in Appendix II. for details regarding these principles.]

As compared with other countries, the almost total lack of any classification of the roads in accordance with their relative importance, is especially noteworthy. Roads are usually divided in the statutes into public and private, and in many cases "toll roads" mark those of most importance. Only four or five states seem by classification into county and town roads to recognize the essential difference in importance; but even these states do not all make provisions for special management of the more important roads so as to secure a better road-way. In fact, the division is often, if not usually, made from the location of a road in two or more towns, and not from its relative importance.

As we should expect from the foregoing, in none of the states is there regularly employed on all the main roads, either in laying out the road or in working it, skilled engineers. Ohio makes such provision for her turnpikes; Illinois permits the commissioners to employ an engineer to supervise the road work—but the permission is very rarely acted upon. For

laying out roads, competent surveyors are employed in several states; but even this work is usually done by a committee of viewers selected from the community,—men, to be sure, who might select with some skill the general line of the road, but who, from the very nature of the case, could not take into consideration the questions of grade, soil, drainage, etc., that would be prominent in the mind of an engineer. Surely an engineer—not a mere surveyor—should always be consulted in the laying out of a road, if the road is to be a permanent one. “The choice of a road will often make a great difference in the quality of the road obtained.”¹

A striking instance of the need of some skilled help in laying out a road is to be noted in Western New York. Two villages, A and B, situated at some distance apart, had a difference of level of eight hundred feet. The old road laid out by “viewers” so ran that in going from A to B a traveller ascended twelve hundred feet, and in going from B to A he must ascend four hundred feet. An engineer laid out a new road, making the ascent on the road from A to B eight hundred feet; from B to A, of course, nothing.

The general custom seems to be to make small districts the unit of administration. In the southern states, where the county is the unit, the county authority, as a rule, limits its duties to dividing the county into road districts and appointing over each district an overseer. Of course this gives no *system* of roads more than does the sole supervision by township authorities. In the New England States, and those settled in large part from New England,

¹ *Engineering News*, January 29, 1876.

the township system is found, a system which in itself prevents unity of administration, unless some higher authority is especially empowered for this purpose, a provision very seldom made. This local administration under whichever form it is found would, of course, effectually prevent any thorough classification of the roads. No general supervision for a whole state, and no means of general state organization is found in any state.

With the exception of five states the labor tax is regularly employed; in four more, in case of a special levy, and in one (Illinois) only by vote of the town. It is worthy of note, however, that many of the towns, in some of the counties a very large majority of them, do vote for the labor system.

Still worse is the law in the six states that make no provision for a money tax, but rely wholly upon the labor system. It is, perhaps, worthy of remark that they are all southern states; and the law is doubtless a relic of the past. Individuals in those states, more frequently than in the north, agree to keep certain roads in repair.

In the northern and western states, those laid out into sections one mile square by United States Survey, the custom obtains of running nearly all the roads on section lines, and the half and quarter lines. The custom is a very natural one and has many conveniences; but its wastefulness and inconvenience in other respects are no less noticeable. The general system of laying out roads will be discussed in a later section and need not be dwelt upon here.

Toll roads are generally found in the states, though ten of the states or territories are without them. To

judge from the states not having them, one might argue that it was a sign either of one of our best road systems or of a very poor one to be without toll roads, for states of both classes are included in the list. Of the many having toll roads, only a few, and those all newer states and territories, make provision for their early surrender into the hands of the public. More, evidently, consider them permanent, making no provision for their acquisition by the public, though the common law right of eminent domain would doubtless hold without the express provision to that effect given in the statutes of other states.

Many provide for the forfeiture of the charters of toll companies for failure to keep the roads in good condition, though as we shall see it is difficult to enforce this law. Others provide for the surrender of the charter by the vote of the corporation itself, or by the abandonment of the road. It is probably true that toll companies in the northern states at least are becoming somewhat less common, and that in these states they are held under somewhat better control by the public than in the South. One or two states provide for toll roads managed by the local government, a provision that seems wise if tolls are to be collected at all.

The elective system of selecting road officials, as we should expect, is more common in New England and the North: the appointment of such officials by the county court or other like authority, more common in the South, though exceptions are found in both cases.

The less important provisions of administration; such as the method of calculating the labor tax, the assessment of damages for land taken for road pur-

poses, the number of road officials in the different sub-divisions, the limitations to the amount of tax levied, etc., need not be dwelt upon here. The more important ones will be found tabulated in Appendix II.

III.

TAXATION FOR ROAD PURPOSES.

Perhaps the most fundamental question in connection with road legislation is the determination of the distribution of the burden of support of the roads. Until that is settled, all discussion regarding the proper officers, or road regulations, are beside the point. The question is one, too, that has been answered in various ways in different parts of our own country, as well as in the countries of Europe; and we must expect that the answer is to be given, in good part, on the grounds of practicability and political expediency, not solely on the ground of even-handed justice. The latter is hard to determine in many cases. The varying circumstances in different localities make any fixed rule at times more or less unjust, so that we are finally driven to ask, what will, on the whole, be most nearly fair? and what plan will, in the main, give the best results for the community as a whole?

It is, of course, entirely beside the point in this place to enter into any discussion of the proper basis of taxation for road purposes or for any other administrative purpose. There can be little question, as will appear hereafter, that the ordinary roads of a country are so far a general benefit and

ought to be a general charge, that the ordinary fees collected on toll roads must be considered to a certain extent unjust, so that we should not raise revenue for road purposes—except in special instances—by fees alone. In general, though, whether for ordinary taxation we adopt the principle of a tax according to ability, or according to income, or according to faculty, or any other one, we might and probably would still agree that the principle—so far as it can be realized—that should govern the distribution of the expenses of making and repairing ordinary roads is this: Let the burden be distributed in accordance with the benefits received. How nearly in practice can this principle be reached?

The toll roads have always been conducted on the theory that the travelers over a road were the recipients of the benefits and should pay for its support. If, however, cities derive as much benefit from good roads as the discussion in the first section would lead us to think, it is evident that the travelers are by no means the only ones benefited. The cities, the land-owners near the road, and others should therefore aid; and the toll road, though possibly at times the only practicable one, is nevertheless unjust in principle,¹ and should be avoided if possible.

¹“C'est un principe très-erroné, en saine économie politique, que de croire que le payement des dépenses des routes et chemins doit porter uniquement sur ceux qui traversent matériellement ces chemins et routes. L'utilité de la viabilité est beaucoup plus générale; le marchand ou le consommateur de Londres, qui n'est peut-être, de sa vie, sorti de la cité, profite des routes du comté de Lancaster et du comté de York, de même que le *country-gentleman*, qui les traverse journellement à cheval ou en voiture.” Leroy Beaulieu: *L'administration locale*, page 182.

Further discussion of toll roads from the standpoint of practicability will be given in the latter part of the section.

It has been the custom in Ohio, Indiana and some other states to lay out, open, grade and construct turnpikes, and to pay all or part of the expenses by an assessment upon the contiguous lands benefited thereby. There can be no question that adjoining lands are benefited; and there seems no injustice in such a levy, provided it reaches all benefited and is restricted, as in Wisconsin,¹ to the extent to which the land is actually benefited, and is not levied in accordance with the estimated cost of the improvement. Such a levy, however, if restricted to land within three-fourths of a mile, or even within two miles, as in Ohio, still fails to reach all those benefited; and if the road were built by general tax the benefit received by the nearer lands would—or should at any rate—appear in following years in the increased assessment value for taxes for all purposes. Doubtless this assessment plan though, by stimulating farmers to secure good roads, even at this extra expense, has in many cases proved beneficial, notably in parts of Ohio and Indiana, though it seems that a general property tax on all the territory affected by the road, including the cities, would be more nearly just.

There is also a plan adopted in France and elsewhere of levying special assessments [subventions industrielles] “on the principle that certain industries and manufactures which make use of large wagons and cart very heavy loads cause an abnormal wear

¹See Desty on *Taxation*, Vol. II. 40 Wis. p. 327; 37 Wis. p. 75.

and tear of the roads, the repairing of which cannot be fairly charged on the general body of ratepayers. This is particularly the case with sugar factories, distilleries, and other industries whose chief period of activity is in the autumn and winter, when the roads are wet and peculiarly liable to be cut up by heavy traffic."¹ This special tax must of course always be spent on certain specified roads or portions of roads that are especially affected. Certainly nothing can be said against the justice of this plan, provided the special tax is fairly laid. It may, however, be a question whether most of our states would not on the whole do better to burden industries only by the property tax regularly levied. Capital is inclined on slight grounds to seek new places of investment, and discouragements usually should not be thrown in the way of investment. Where a special road tax is levied, however, such industries might well have assigned them, with their consent, a special piece of road to keep in fit order, as is now done in some instances.

It needs, further, to be taken into consideration that the different roads vary so much in the character of the traffic over them that some classification is clearly required, in order that various plans of support, adapted to the varying circumstances, may be adopted. In the case of merely local roads leading from two or three farms to the main road, almost the whole benefit of the road comes to the farmers themselves. To be sure their increased

¹*Nineteenth Century*, June 1888, p. 935. Also, *Loi du 21 Mai*, 1836, Art. 14, repeated in Art. 86 of the *Loi sur les Conseils Généraux du 10 août*, 1871.

facilities for getting their products to market, if this local road were improved, might help somewhat the dealers in the neighboring town; but this advantage is so slight compared with that derived from the main road that it may well be neglected entirely. If we consider, on the other hand, a main road running through several townships, and joining thriving cities, it becomes evident that the landowners in any one township, especially in the township lying nearest the market, receive probably not half the benefit, a large part of it going to the market town and another part to the farmers living at a greater distance from it. It seems clearly unjust that the town should be asked to undertake the whole support of such a road; and, besides, we may be reasonably sure that in many cases the conflicting interests of towns in different situations will hinder the building of through roads, if the matter is left in the hands of town authorities. An editorial in the New York *Evening Post*, January, 1889, says: "We know of a village within fifty miles of New York which deliberately refused to keep a piece of main road in repair, because it would, if in good order, divert traffic from its own stores to those of a neighboring village." Such instances are not uncommon.

From the standpoint of justice, then, local roads should be separated from main roads; and it seems probable that the support of local roads by the local residents, say the residents in a township, and that of the main roads by the inhabitants of larger administrative divisions, as the county, will divide the burden of support as fairly as it can be determined. The experience of the leading countries

of the world favors this plan. In addition, special contributions might be taken from those whose use of portions of the road tended to wear it unduly.

The distinction that is oftentimes made between the cost of building a road and that of repairing it (the larger division building, the smaller repairing), is sometimes to be defended on the ground of expediency, but hardly on the ground of justice. Of course, we may repeat, expediency in many such cases should determine the plan to be adopted, so long as flagrant injustice is not done. In the case given, however, the aid comes from the larger subdivision to the smaller, because the latter is unable to bear the large expense of building local roads, and main roads should be repaired, as well as made, by the larger administrative body.

If it were granted now, that the roads should be supported in the main by the various administrative subdivisions, state, county and town, as suggested above, a further question would arise as to the character of the tax—property tax or poll tax, money or labor tax.

Poll taxes are considered by most writers a poor form of tax, and in ordinary cases “unworthy of a civilized nation in the nineteenth century.”¹ Still we have the practice of many of our states, and of some of the European states at least, in favor of a capitation labor tax for road purposes. On the ground of justice, little can be said against a capitation tax for this purpose, if combined with a property or income tax. Surely, every man in sound health derives much pleasure and advantage from good roads,

¹Ely: *Taxation in American States and Cities*, p. 209.

whether he rides or walks. If he gets no pecuniary profit, the lessened fatigue from walking is by no means to be overlooked. The fact that under cover of this tax many men simply waste a day in telling stories and pretending to work, while others thereby escape from payment of a substantial money tax that would otherwise be paid, is the chief objection to it,—an objection, too, that under our present system is strong enough. It is doubtless true also, that in many cases this tax is not collected, though in many places the labor tax is quite strictly enforced. When eighty-five to ninety per cent of those subject to the tax either work on the road or commute, it cannot be said to be a failure in this respect, and this per cent, in some road districts and townships, is collected.¹ A poll tax in money is, of course, not so well paid, and would hardly be defensible on grounds of expediency. The defence for the labor tax, then, so far as it can be defended, is simply this: That many who should pay a small tax may be made to pay this, who would not and could not well be compelled to pay a money tax. It is well, of course, to have a really favorable rate of commutation, if this tax is to be employed.

Unless we change the methods of working the roads, however, the tax, as is intimated above, may, and probably does, do more harm than good. The remedy for this—as for many other defects of our system—lies in securing efficient road supervision. Under a paid official who was expected to earn his salary, the work would not consist of story-telling and visiting so much as it does at present, while the

¹Ely: *Taxation*, p. 210.

teams might be used to advantage. In France, according to Mr. Waddington,¹ the experience with manual laborers is something the same as with us. "The regular paid laborers do more and better work than the casual workmen who come to acquit themselves of their 'prestations.'" The experience of French officials with teams, though, owing to their good planning, is much more favorable than ours, for "the more carting is done by the 'prestataires' the better for the county finances, for it is cheaper than hired carting." The farmers "can choose their own time and do their carting when their cattle and wagons are not required for the work of the farm."

Surely, if the trained French officials cannot get good work from the men working out their road tax, we cannot expect our officials to do so.

As a supplementary tax, to be permitted after a high money tax has been expended—as in Nevada—this labor tax is perhaps at times advisable. In that state the commissioners set off first the net proceeds of the county's share of all poll taxes, *i. e.*, one-half of a \$4.00 poll-tax [Their poll-tax is not defended here]; also on petition of a majority of the *property holders* in the district, they may levy within such district a sum not to exceed \$3.00 upon each \$1,000 valuation, which tax is to be collected by the road supervisor and paid into the treasury for a road fund; "provided, that any person owing the last named property tax, may pay a part or all of the same by labor on the roads of the district under the direction of the supervisor thereof," at the regular fixed rates. It seems but fair that if there

¹ *Nineteenth Century*, June, 1888, p. 934.

is a special *extra* property tax voted by the property owners the tax payers shall be allowed the option of paying it in labor. This would, of course, be paid mostly, by the work of teams with the men, and might well be as advantageous as under similar circumstances it has proved in France.

The experience of some of our states with toll roads seems to justify a few paragraphs regarding them written, not from the standpoint of justice (It has been seen that this would condemn them), but from that of experience and expediency.

While in most times and countries the local roads, as soon as roads have been held as such distinct from a right of way over land, have been in the hands of the public and for the free use of all, the raising of money for the support of longer and more important roads by tolls, either on the part of the government itself or by corporations that have built the road as a private enterprise, has been common. In earlier times it was not uncommon, too, for the state to place the tolls so as to derive from them a revenue¹ to be used in the extension of the road system; but in later times if they cover the cost of support of a road it is usually considered enough.

In a new country where for long stretches of territory there are few or no inhabitants, though there may be much traffic, and where the amount of property subject to taxation is comparatively small; where, too, on account of the scarcity of population in some sections and density in others, a taxation for road purposes would distribute the burden very unevenly, a toll road may, perhaps, be

¹Schönberg: *Handbuch der Pol. Econ.* Sax. § 28.

justified. In fact, it is sometimes a question in such cases of a toll road in private hands or no road worthy the name, for the people cannot be roused to make the immediate sacrifice, and a toll road seems better to most voters than a bonded debt. If under such circumstances the privilege to build toll roads is granted, it should be only under strict conditions. Of course, the rates of toll will be determined by the representatives of the people; but there should also be a general law providing for the surrender of the company's franchise. The provision of the Nevada law in this respect seems a good one. There, after ten years from the building of the road, it becomes county property; and after five years the county may at any time purchase at an appraised valuation.

There is danger, however, even in such a case, that the toll companies, if the road is found profitable, may be enabled to secure legislation that will give them a more secure control. In some of our southern states, no provision is made for the levying of a money tax for the support of the roads. The local roads are worked on the highway labor system, and the more important roads are in the hands of toll companies. These are not unfrequently able to neglect repairs on their roads, and still to bid defiance to any attempt to force them either to comply with the conditions of their charters, or to surrender them. As a fair example of the way such a system works when the chief control of the roads is in the hands of toll companies, the state of affairs in Maryland at the present time may be cited. Prof. Ely of Johns Hopkins University writes me regarding them as follows: "The pike companies will naturally do all they can

to keep us from securing satisfactory legislation. If we could construct satisfactory roads, of course their occupation would be gone. These companies will not improve the roads themselves, and at the same time they will not allow any one else to do so. . . . Of course, when the companies are few, they have less influence with the Legislatures. All that the farmers in Maryland can do is to get up parades and march through the roads with banners with such inscriptions as '*No Improvements, no Tolls.*' Since the boundaries of Baltimore have been extended there are toll roads even within the city, but the city authorities cannot, or will not, compel them to do their duty and keep the roads in satisfactory repair. *Practically* the only recourse left seems to be the undignified one of impotent scolding." There can be no question that the tendency of the toll-road system is toward a state of affairs such as that represented. If the longer and more important roads are mostly in the hands of private corporations, they have of course a monopoly, and can do about as they see fit. Their inclination would naturally be to expend as little as possible in repairs so long as they saw no serious risk of forfeiting their charters; and the people are slow to force such a forfeiture, even though it is deserved. The fact, too, should not be overlooked that under such circumstances the interests of the toll companies would lead them to oppose by fair means or otherwise any legislation that would tend to improve the roads of the district.

The remedy for such evils is clearly the assumption of the support of the roads by the public; the course that, as we have seen, is enjoined in the case of all fairly well settled sections of the country by economic

considerations as well as by the political one just mentioned.

It is this course, too, that is coming to be more and more observed in our older states and in Europe. In England, where the private turnpike system had its greatest expansion, its day is past, and the state in the main has assumed control.¹

The expenses of management were so great in England that many of the turnpike trusts became hopelessly involved in debt, and this condition of affairs, taken in connection with the obstruction to traffic from the gates, and the burden on the people has led to their gradual abolition. In Germany, too, Roscher assures us the expense of collecting the tolls has amounted to seventeen or eighteen per cent of the gross receipts. From experience, elsewhere, it seems quite possible that the poor condition of some of the toll roads in our own country may arise from the real inability of the companies to improve them without suffering a real loss on the investment.

IV.

ADMINISTRATION OF ROADS.

If the burden of support of our country roads is to fall directly upon the people, and the necessary funds are to be raised by taxation, it is evident that such taxes should be levied by the authorized representatives of the administrative sub-divisions concerned. If, as has been suggested, the roads be classified with reference to their importance, it would seem that the county board of supervisors, or the corresponding deliberative body where this name is not used,

¹ Roscher: *National-Ökonomik*, Kap. 11. See also section V.

should decide upon the amount to be raised for the most important roads, while the town officers should have similar rights for the local roads. In case a main road should in part of its route perform the function of a local road, of course the town should pay into the county fund its fair share for this purpose.

Clearly, too, the decision regarding the classification of a road should be left to the County Board, as the body most nearly representing the interests of all concerned.

In Ontario, Canada, the county council by by-law assumes jurisdiction over any road in any township and the expense of its construction "with the assent of such township."¹

The objection of the town should not necessarily prevent the assumption of such control. A town might, for the sake of preventing a rival village from securing a good road, and therewith a lucrative country trade, object to the support by the county of a road which was really a county thoroughfare.

In fact, unless there were some such unjust reason, it is probable that the inhabitants of the towns would usually much prefer that their roads be supported by the county. As each town is represented on the board, no real injustice need be feared if the county board planned the system of roads for the county, assuming for county support those that seemed of real significance for the county as a whole, and leaving the others to be supported by the towns.²

¹Statutes of Ontario, 1877 ; p. 1748.

²Some special legislation, or even a Constitutional amendment might be required in some states to carry this plan out.—Cf. Cooley, *Taxation*, p. 130. "It has been held that where a city, under competent legislation, improves its own streets, a county tax for roads can-

Clear as it seems that the amount of money to be expended on the roads should be determined by the representatives of the inhabitants of the districts concerned, it seems equally clear that the respective boards should act with an adequate knowledge of what is needed, and of its probable cost, and that the money should be expended under the direction of one capable person who may be held responsible for the results attained. Both of these conditions are such that they can be met only by the appointment, or election, of a man who shall be competent to direct all work done in connection with ordinary road and bridge building, *i. e.* a civil engineer.

It seems hardly necessary to call up the well known arguments in favor of the appointment instead of the election of such an officer, or as one would prefer in this case the hiring of such an officer by the County Board. Thoroughly trained specialists are needed; and it would very often be the case that the best man for the place could not be found in the county.

Compare, as an illustration of the different workings of the two systems, our city superintendents of schools, hired by boards that are as subject to political influence as county boards of supervisors, in many cases even more so, with the county superintendents of schools where they are elected by popular vote. That many of the county superintendents are good men

not be laid upon its inhabitants. *Martin vs. Aston*, 60 Cal., 63. But it is doubted that this is universally true. For a somewhat peculiar case involving the construction of a statute for taxation to make a country road, see *King vs. Aroostook Co.*, 63 Maine, 567. One half a township, in a different tract, is held liable for a tax to support a county road which lies entirely in the other half."

for their positions is true ; that many city superintendents are poor men is also true ; but that first-class men are far more often found in the positions filled by the boards cannot be questioned. The position of engineer of roads certainly should not be an elective office, to be filled necessarily by men within the county.

But to speak again of the necessity for such an officer.

In the first place, in order that a board may know how to expend money judiciously, or how much will be the cost of a road throughout any part of a county, a good topographical map must be made, showing the grades on all the roads, the character of the soil, etc. This can be made, of course, only by an engineer; and the significance of each of these factors in the expense of road making can be estimated only by a man familiar with such work. How often do we find even on fairly good roads, steep hills which, though often short, are enough to prevent the hauling of heavy loads over them without doubling teams, a means of overcoming the difficulty that is often impracticable. The following brief table giving the loss of power on common grades is certainly not known by our country road-builders, or at any rate is seldom acted on.

A force which on a level road will draw one hundred pounds,

On a grade of 1 in 44, or 120 feet to the mile, will draw 75 lbs.

On a grade of 1 in 24, or 220 feet to the mile, will draw 50 lbs.

On a grade of 1 in 10, or 528 feet to the mile, will draw 25 lbs.

These facts are, though, familiar to every engineer, and would be, with all the other important ones, ready at the service of the board every year when the

question of the amount to be expended on the various roads of the county was considered, with specific recommendations as to the important roads.

For the intelligent assessment of the county road taxes, then, the services of a skilled engineer seem indispensable. Even of more importance, if possible, does he become when the question of the wise expenditure of the taxes is raised. Road commissioners under the present system say frankly that they think at least one half the money tax expended for roads in the State of Illinois, is wasted, through ignorance or carelessness, while of course a much greater proportion of the labor tax is wasted, not to speak of that which results in a real detriment to the road. This waste, then, which could be largely prevented by a supervising engineer, costs that state annually from two to two and one-half millions of dollars of the tax already collected, to say nothing of the loss arising from the poor roads. Although nearly every farmer has some ideas of the way in which a good road should be built—by gravel, or sand and clay, or broken stone, or drainage—it is, nevertheless, doubtless true that much scientific knowledge, as well as experience in working various kinds of soils are required in a good engineer. To build and repair to the best advantage all the main roads in any fairly well settled county requires certainly as much skill in an engineer as to lay out and build a railroad through an ordinary county, and probably more. The problem is not so much that of making good roads, as that of making the best roads possible with the limited means given.¹

¹*Note.*—Very proper provision has been made by the Engineering Department of Vanderbilt University, Nashville, Tenn., to

An engineer with a fair prospect of holding his position for a series of years would of course look ahead in his plans. The building of a permanent road extending across the county might well be undertaken, even if the completion of the work could not be expected for several years. There would be the certainty that good work in one part of the road would not be blocked by the refusal of some township to do its share, and there would be a continual rational expenditure of the money where it would do the most good.

In his "Practical Treatise on Roads, Streets and Pavements," Gillmore calls attention to another common defect of management that demands special legislation. He writes, "A pernicious custom prevails throughout a large portion of the United States of repairing country roads only at certain seasons of the year. The cost of maintenance would be greatly reduced by frequent repairs, and especially by keeping the side ditches clear and open to their full width and depth, by promptly filling in the ruts, and by

supply in some measure the need for skilled road-engineers. One principal or deputy highway official from each county in Tennessee is admitted *free of charge* to a class in Road Engineering. The following paragraph, quoted from a circular of the University, shows the main features of the course: "The course of instruction will extend from February 1 till April 1, and will consist of lectures and work on the economical location of highways to conform to conditions of topography and traffic; principles of construction of new, and of reconstruction of old roads, and of maintenance *vs.* repairs; methods of drainage; simple highway structures, retaining walls, drains, culverts, simple bridges; practice in field-sketching, simple platting and draughting, instrumental location, and computing estimates of cost; study of systems of highway administration." It is to be hoped that other institutions, especially the State Universities and the Agricultural and Engineering Colleges, will make similar provision.

maintaining the required slopes from the centre toward the sides.”¹ In accordance with the laws in some of the states, it would be difficult to follow his suggestions. Clearly it should be within the power of some official, who could see that the work was faithfully done, e. g. a county engineer, to hire a man, (or better, as they could work to much better advantage, to hire two men, with a team, part of the time), whose work would be to make these lesser repairs from day to day as they became necessary. A district of sufficient size to keep them busy throughout the year whenever the weather permitted, could easily be arranged. Of course, such work would need to be supplemented at times by the work of more men, as for example in the case of bridge building, or the making of a new road, or more frequently in the late summer when the noxious weeds along the road sides needed to be cut before the seeds had ripened and been scattered over the adjoining fields.

Another almost imperative need that could easily be satisfied by a plan of county organization of the roads is that of suitable machinery. A good steam roller—an almost indispensable requirement for good dirt road making—costs in the neighborhood of \$5,000. A town hardly feels able to buy one; but two or three adjoining towns, if so organized that they could work together readily, or a county, could well afford it. Though such a machine seems expensive, if, as is claimed, “it will do the same work at one quarter the running cost and in one half the time of a first-class horse road-roller,”² it will pay for arrange-

¹A *Practical Treatise on Roads, Streets and Pavements*, by Q. A. Gillmore, A. M., New York: 1876, p. 78.

²Herschel: *Engineering News*, July 14, 1877.

ments to be made by which it can be purchased. This is further emphasized by the fact that engineers assert that good dirt roads can hardly be made without such machinery, whereas with it, on common prairie soil, a really good road, thirty-three feet wide may be made at an expense of only \$300 per mile.

T. J. Nicholl, an Illinois Civil Engineer, in a paper read before the Civil Engineers' Club of the Northwest,¹ estimates the cost of a mile of such prairie road as follows :

Engineering, laying out and superintendence....	\$ 25 00
1200 yards excavation of ditches @ 10 ¢.....	120 00
Say 300 yards for extra embankment @ 10 ¢....	30 00
3000 feet B. M. oak bridging, framed, @ \$30....	90 00
Rolling.....	10 00
Clearing up and leveling off.....	10 00
Total, per mile.....	\$285 00

Of course, these prices would vary in different localities. He adds :

"The cost of a 15-ton roller would be about \$5,000 delivered. Cost of operating same ; labor, fuel and repairs, \$5.00 per day ; width rolled, 6 feet ; average speed two miles per hour ; at this rate it is safe to estimate they will roll two miles per day over a surface nineteen feet wide. Roads made with these rollers will require repairs like all others, but they will not be expensive, consisting of filling up ruts and holes with good material and rolling. In dry weather when roads are good, the rollers can be taken off, and driving wheels put in their place forming a traction engine. The cost of a machine so arranged will be about \$500 extra, and will pay for itself in hauling gravel, cinders, broken stone, etc., for permanent way, or in moving the farmers' grain and lumber, while they are busy in the fields planting or harvesting. Almost every township in the land could afford to own a roller and pay a competent man to use and take care of it."

This somewhat technical quotation shows that without some change in our legislation there is

¹Published in *Engineering News*, Sept. 26, 1878.

practically no chance of securing the expensive machinery that may in many places be required, and that by means of its usefulness would soon save far more than its own cost. Still further it emphasizes the need of an engineer for the supervision of such work. Whether all of Mr. Nicholl's conclusions be exactly correct or not, is of slight consequence here; but an engineer, we see, will at least have some intelligent plan of work. Of how many of our road commissioners can the same thing be said? To the objection that might occur to some, that an engineer's plans as illustrated by the quotation are likely to prove much more expensive than our present methods, at least these answers are suggested: The plans promise some result; the money now *wasted* in an average county according to the estimate of our present road commissioners, would be enough to buy at least two such rollers every year and pay twice the salary of the engineer. An engineer would be expected, and with reason, to prevent such waste almost wholly.

In order to make the management of the roads most efficient, and especially to secure the most improvement in methods of road making, one other thing seems necessary. There is really very little known at present about the best methods of making fairly good roads at small cost. Permanent roads, such as the macadamized roads, Telford roads, pavements, etc., are well understood; but in our country there is great need for good dirt roads, and intelligent means of making and repairing them. In many parts of the country stone roads are for the present entirely out of the question, except for the leading thoroughfares. Now, in consequence of

this state of affairs, it is of great importance that the results of experiments actually made become generally known to road makers.

The only sure way, the only practicable way to secure any such result would be to have the county engineers in a state required to make to some central authority a report of the work done in the counties. Such a report should contain an account of the state of the roads, their grades, character of the soils, methods of improvement, cost of improvements with details given, and so far as could be ascertained from year to year the results of such work. This state engineer—or better, state board of engineers—could then collate these reports and publish whatever statistics and facts seemed to be of permanent value or of general temporary interest. The aid that would in this way be given by such a report placed in the hands of practical engineers would soon be seen in the effect throughout the state. Such a state engineer, with a small corps of assistants—or better such a state board—it would seem, could do much to harmonize the interests of adjoining counties so that the roads might be laid out and worked with some system, even outside of county lines. Such a board could do much in the way of securing by legislation or common agreement general provisions regarding grading, width of road-bed, character of bridges, etc. Through them, doubtless, too, would be organized associations of the county engineers, where the practical difficulties confronting them could be in good part solved by mutual conference. Their investigations would doubtless give in a comparatively short time a basis for formulating, so far as seemed necessary, a law of the road regulating

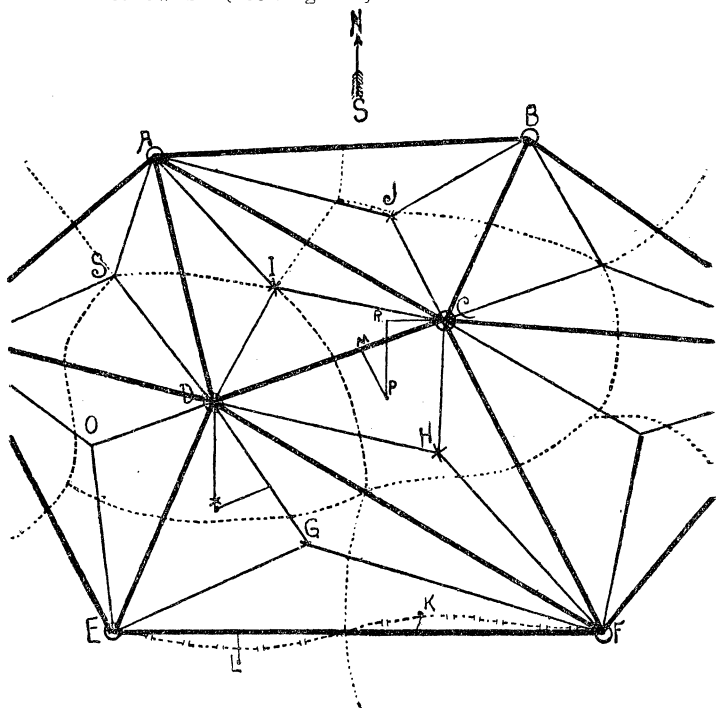
width of tires, weights of loads, etc., regulations that of course should not be made without intelligent forethought and investigation.

A question that in the United States has received little attention, but that in the newer states is one of great practical importance, relates to the laying-out of the system of roads in any locality. In many of our states, especially the northwestern and western states, which have been platted by the United States survey, it is customary to lay out all roads on section lines, or parallel to these lines, in order that the land may lie in unbroken blocks, and the roads form natural division lines. Doubtless there is a certain convenience in having the roads thus regularly laid out. The distances from place to place can be easily reckoned; the farms lie in compact form, etc. Clearly, however, it is not primarily the purpose of roads to perform these subordinate functions. The division lines between townships, as well as between farms, can be known and made visible without trouble, and while a change in the system would often divide a farm, the owner would be compensated in most cases by a shorter way to the market town, while the inhabitants as a whole might be much better served with many miles less of road. The problem in laying out a road, since the purpose of a road is primarily, if not solely, to afford a means of communication for the people, is, of course, to bring the largest number of people—markets and traders—into communication, with the least amount of travel. The plan by which this is most readily done is given by a competent road engineer in Germany, who is quoted by Sax in his well known work on Transportation. The following paragraphs, giving the plan and the problems

to be determined, are a free translation from the work:¹

1. From every important market town, roads of the first class are to run to all important neighboring markets.

2. If the district surrounding the market town is a large one, in the angles between the roads of the first class others of the second class are to be built to any smaller markets situated near the line dividing the territories tributary to the larger market towns. From these smaller places, forks must be built to the two nearest important market towns. (See diagram.)



The heavy lines represent roads of the first class; the light lines, those of the second class.

The dotted lines represent about the division of the territory tributary to the different markets.

¹ *Ueber Rentabilität und Richtungs-feststellung der Strassen*, Hanover, 1869, by Weg-bau-Conducteur Launhardt. Quoted by Sax: *Verkehrsmittel*, vol. I. pp. 147-8.

A, B, C, D, E, F, large markets.

G, H, I, J, O, S, smaller markets.

K, L, small places near a main road. The question to be determined : Is it better to deflect the direct line of the road to K and L, as indicated by the curved broken line, or to join by a branch road ?

A man at P now gets to C by the road PRC; under this system by an equally short route, PMC.

A man at X, with D, his natural market, situated on a section line, of course loses by the change.

Consider the gain to C in doing business with B, A and D.

Notice the distance saved in going from F to A, or from E to B.

3. If a road of the first grade at some point in its course between the large towns touches the territory tributary to a third important market, from that point a road is to be run to this third town.

4. Encircling roads, *i. e.*, roads that follow the lines dividing the territories tributary to different markets, are *not* to be built, unless they constitute roads leading to a depot [Ladeplatz] (station of a more general system of transportation.) This can frequently be the case, since depots for very obvious reasons will generally lie near commercial boundary lines.

The determination of the line of a road between two points is a further problem that must be considered under three heads.

1. The determination of the exact middle line of the traffic, *i. e.*, that line which runs through the tributary territory in such a way that the statistically calculated mass of the traffic [the quantity of freight multiplied by the distance hauled] on the right equals that on the left.

2. The determination of the variation of the road from this central line of traffic on account of single collecting points of traffic lying near. This matter should be investigated statistically; and it should then be settled whether it is the more advisable to unite these points lying to one side of the middle line of traffic with the road system by branch roads or by a bending of the main road from the middle line of traffic; also whether it is not advisable to unite, at some distance from the large market towns, every two or more converging roads, and let the traffic from both be carried into the town over one road.

3. The determination of how far we should swerve from this theoretically best line for the road on account of the lay of the land character of the soil, etc.

The principle here laid down is, of course, the one that the railroads on a large scale do, to a considerable extent, put into practice, though the conflicting

interests of the different lines and the necessity for paralleling lead to many more variations than would be the case if the railroads were all planned as parts of one system. A glance at a railroad map of one of our prairie states will show, nevertheless, that the principle has been applied in practice, the competition for traffic, and the consequent desire to secure unoccupied territory, forcing the different roads into a sort of system that does give to nearly every market of any importance a fairly direct road to the great centres of trade.

An examination of the accompanying diagram will show how very much better served a community would be with roads laid out on this plan than with roads running north and south, east and west only. Of course the greater part of the population is comparatively near the towns or along the roads that naturally connect them. Notice, then, for example, how much better served those living in or near C or D are, in their traffic with the neighboring towns, than they would be if the roads were on section lines.

The diagram does not give, of course, the comparatively slight deflections that many of the roads would have on account of a more thickly settled country on one side than on the other, nor the changes that should be made on account of hills, character of soil, etc.

That such a system in its entirety should be carried out is hardly probable anywhere, least of all in our country. In some places in our rapidly growing states, the roads would need to change their lines every few years to suit the changing circumstances. A consideration, however, of the

great gain of such a system to all parties concerned will tend to hinder legislation which looks only to roads running by the cardinal points, and might, when a county is fairly well settled, lead to many more of the so called "diagonal" roads that usually prove very beneficial, in spite of the complaints of the farmers whose farms are thereby cut into irregular shapes.

Of course, at present, the railroads form the roads of the first order, when one takes large stretches of territory into account. When, therefore, these are built through a new country, it would seem the part of wisdom to lay out the wagon roads, thereafter, somewhat with reference to the fact that both are a means of transportation and should supplement each other so far as can be conveniently arranged.

V.

SYSTEMS IN OTHER COUNTRIES, AND SUGGESTIONS OF ENGINEERS.

Before offering in condensed form what seem, on the whole, to be the essential requisites of road legislation suitable for the United States, it seems desirable to consider briefly the forms of legislation, so far as concerns classification and burden of support, that the experience of the older countries of Europe have led them to adopt, as well as the opinions of leading road-makers. Though the sentiment is frequently heard in Congress, and though some of our newspapers seem to uphold it strongly, that our government, including the methods of administration, is the best in the world, we shall still do well to study Europe. Most Americans believe, doubtless, that in matters relating to the

form of government, political theories, etc., we have little to learn from the nations of Europe, except by way of shunning their examples, while they have much to learn from us. In purely administrative matters, however, is it not reasonable to conclude that their methods are superior to ours? Surely experience is doing much for us in this respect; doubtless it has done much for them. It is much to be regretted that we are often too unwise to avail ourselves in administrative matters of the experience of older countries when it lies at hand. Of course, as we shall see in the case of the road laws, many minor changes are usually needed to adopt their plans to our circumstances.

In Prussia, and so in the German states generally,¹ the roads are divided into at least three general classes:

1. *State Roads*.—[Sax: Haupt-strassen, Von Rönne, Kunst-strassen oder Chausséen.] These roads are those of the most general significance for the state as a whole. They are the military roads, and those that connect the larger market towns. From early times, these have been built and supported by the state, and managed by the state officials.

2. *Provincial Roads*.—[Neben-strassen, Provincial-strassen, Bezirks-strassen.] These, as their names indicate, are roads that connect the main roads, and are their principal feeders. They are supported mainly by the province or kreise, as the case may be, with aid from the state treasury, if it seems necessary or advisable. For the extension of these permanent roads there are certain funds [Provinzial-Strassen-Bau-Fonds, Bezirks-Strassen-Bau-Fonds]

¹Von Rönne: *Staatsrecht der Preussischen Monarchie*, II, 2. Sax: *Verkehrsmittel*, Vol. I, page 107.

regularly set aside, made in part, as implied above, from contributions levied on the province concerned, and part from contributions granted by the state, while there is still to be added the income from tolls, which are also levied in some places—though by public authority and public officials, it is to be noted. In the administration of this fund, the provincial representative board unites with the state officials.

In certain cases, too, the state grants a special bonus to aid in building a permanent road, and the work is undertaken and carried out by the local authorities alone, or even at times by private persons, or by corporations established for that purpose.

3. *Local Roads.*—[*Gemeinde-strassen.*] These are of different degrees of importance, of course, but are strictly local in their service. These are supported by the village or district, and are controlled by the local authorities. In many cases, a road of one of the more important classes in part of its route fulfills the function of a local road. In that case the local body is expected to pay its due share for its support.

So, again, in the case of the larger sub-divisions there will often be a community of interests; in which case, also, each division bears its due part of the burden.

France has doubtless the most complete system, and the best roads in Europe. A somewhat complete account of her law and its working will be found in Appendix I., of which the following is a brief abstract.¹ Her roads fall into five classes.

¹See also Sax: vol. 1, p. 112 ff. Block: *Dictionnaire d'administration*. Articles, Chemins vicinaux, voirie, etc. Leroy Beaulieu: *L'administration locale*, pp. 182, 186, etc. Boeuf: *Droit administratif*, p. 421–460. Célières: *Commentaire de la loi sur les Conseils Généraux*, du 10 août, 1871.

Roads of the first class [Routes nationales] are entirely maintained by the state, and are "under the management of state engineers, whose chief is the Minister of Public Works." The next two classes [Routes départementales and chemins de grande communication] are supported by the départements, (the county is, of course, our subdivision that corresponds most nearly) with occasionally a contribution from a local subdivision benefited, [canton or commune].

The two remaining classes are local roads of different degrees of importance [chemins d'intérêt commun ; chemins vicinaux ordinaires], supported by local contributions, with aid from the département in case of important repairs, and are managed by the local authorities in the main, with the advice and assistance of the officials of the département, when necessary. For both local and département roads, both money and labor taxes are levied. Special taxes (subventions industrielles) are levied on an industry that wears the road to an unusual extent. A still less important class (chemins ruraux) is distinguished, roads that are little more than ways leading to a meadow, of so little importance that they are not distinctly classified with the ordinary local roads.

The state has also, at times, aided the extension of the system of permanent roads by special grants of large amounts to be expended on roads of the lower classes, e. g. the département roads; by guaranteeing loans, etc.

Belgium and *Italy* follow in the main the French model. In 1867 Italy, by a special grant to the provinces, made great improvement in her roads. The roads of the provinces were divided into three classes, for the improvement of which the state agreed to

assume respectively three-fourths, one-half, and one-fourth of the expense.

In *England*¹ we may also see the same tendency toward classification of the roads and centralization of administration as on the continent, though on account of the form of government, or perhaps, rather from the tendency to abide by old forms that is so strong in England, the administration is more in the hands of the local authorities. The tendency toward classification of the roads, appointment of skilled road makers, support of the roads by larger subdivisions, as on the continent, is very marked of late years; and especially noteworthy is the assumption of the control by the public of roads formerly managed by the Trust Companies. The development of the system in England is well worth following at some length.

In his well known book on "Work and Wages,"² Prof. Thorold Rogers states it as his opinion that in the early days the longer English roads, survivals in many cases of the Roman rule, were good. In the middle of the eighteenth century, however, just before the passage of the General Turnpike act (1773) the roads were in a scandalous condition, rendering communication between different places very difficult. At this period the need of some active measures had become very evident. The picturesque passage from Arthur Young's Tour in the North of England, pub-

¹(a). An act to consolidate and amend the Laws relating to Highways, in that part of *Great Britain* called *England*, 31st August, 1835.

(b). An act for the better management of Highways in *England*, 29th July, 1862. (c). An act for the better management of Highways in *England*, 29th July, 1864. (d). Hobhouse and Fanshawe: *The*

County Councillor's Guide: a Handbook to the Local Government Act of 13th August, 1888. Contains the act in full with comments, comparisons with preceding laws, etc.

²Rogers: *Work and Wages*, p. 133.

lished in 1770, regarding the turnpike between Preston and Wigan, affords the writer an opportunity of expressing his feelings as well as of describing the road: "I know not," he writes, "in the whole range of language, terms sufficiently expressive to describe this infernal road. To look over a map, and perceive that it is a principal one, not only to some towns, but even whole counties, one would naturally conclude it to be at least decent; but let me most seriously caution all travellers who may accidentally propose to travel this terrible country, to avoid it as they would the devil, for a thousand to one but they break their necks or their limbs by overthrows or breakings-down. They will here meet with ruts which I actually measured, four feet deep, and floating with mud, only from a wet summer—what, therefore, must it be after a winter? The only mending it receives in places is the tumbling in some loose stones, which serve no other purpose but jolting a carriage in the most intolerable manner. These are not merely opinions but facts, for I actually passed three carts broken down, in these eighteen miles of execrable memory."¹

To relieve the country in this respect the turnpikes were established—built and managed by the Turnpike Trusts. It was long before they succeeded in accomplishing very much, though they doubtless did make many improvements on special lines. The system had been inaugurated in 1706, though an act

¹For the condition of the roads in England, see *The History of Progress in Great Britain*, by the author of *Inquire Within* series, etc., London, 1862. Also, Porter: *Progress of the Nation*. More interesting still, because better written, is the account of the roads and modes of travel in England in Vol. I. of *Lives of the Engineers*, by Samuel Smiles,—3 vols., London, 1862.

granting the right of levying tolls had passed as early as 1663, which, however, left the management in the hands of overseers.¹ Still earlier even, in 1346, Edward III. granted a commission to lay a toll on carriages passing from one point to another within the present city of London, the roads in those places having become impassable from want of other provision for their maintenance.² These roads gradually, from these small beginnings, spread all over the country under authority of hundreds of special acts of Parliament, until in 1840 there were in England and Wales 104,772 miles of turnpike roads. The opposition to the tolls led in many places to rioting, and the wastefulness and expense of maintaining the system in later years became very evident. In 1871 the census showed that some 5,000 persons in England and Scotland were engaged in collecting tolls, showing, of course, that from twenty to twenty-five thousand individuals were supported in this way. These expenses absorbed a large share of the revenue, and, the other expenses superadded, were so out of proportion to the receipts that many of the trusts were hopelessly involved in debt, unable to pay even the interest.³ For the past twenty-five years much has been done in the way of relieving Great Britain from this nuisance. As early as 1857 or '58 Ireland freed itself from all toll gates. Scotland, by an act of 1878, was freed from tolls not later than 1883, and England has abolished them by the hundreds,

¹Seligman: *Railway Tariffs and the Interstate Commerce Law*, p. 68.

²*Chambers's Encyclopædia*, articles "Tolls," "Roads and Road-making," which is the authority for most of the facts mentioned in this paragraph.

³Roscher: *National-ökonomik*, § 88.

and will doubtless soon be free of them altogether. It has seemed advisable to dwell thus upon the effect of England's toll legislation from the experience of many of our states in the same direction.

The legislation in England regarding the roads supported by the public was of the simplest kind,—the town or parish being made the administrative unit. In 1555 an act was passed which provided for the election of surveyors of roads for each parish and for the working of the roads by a labor tax. Later the “statute labor tax” was substituted for the compulsory labor. In many cases, too, by virtue of ancient custom, certain roads were supported by private estates or individuals. In 1835, the act consolidating and amending all the previous acts made provision for uniting, on their petition, several parishes into one highway district, for a period of three years, or at will of the parishes, by act of the Justices at Quarter Sessions. Each parish was to be represented in a district board by a member elected by the parish, and a district surveyor was to be appointed to have charge of the roads of the entire district. The money raised in each parish was to be expended on its own roads, unless by its special permission. Even the salary of the district surveyor was thus paid piece-meal. The district, it will be seen, formed thus a more convenient basis of administration than the parish in some respects; but the burden of support was not changed at all. Large parishes, sometimes, appointed a special board and hired a competent surveyor for themselves without any union with others.

The supplementary acts of 1862 and 1864 extended the power of the Justices in consolidating parishes

into highway districts, thus making it eventually the common practice. The highway board, elected by the parishes, became a body corporate for the district, the district being now recognized as permanent. This board appoints a regular clerk and treasurer besides the surveyor. In 1862 the salaries of the officers, and other common expenses, were to be divided among the parishes "in proportion to the average of the expenditures incurred during the three last preceding years in such parishes respectively in maintaining and keeping in repair the highways thereof."¹

The expenses of making and repairing the roads, however, were still borne by each parish independently. In 1864 an advance toward unity was made in that the common expenses were now paid out of a district fund contributed by the several parishes, not in proportion to their road expenses, but "in proportion to the ratable value of the property in each parish."² The expenses of maintenance of the roads were still paid as before, each parish paying for its own roads.

The Highways and Locomotives (amendment) Act of 1878 unites wherever possible highway and sanitary districts. The roads are still managed by a board that appoints a skilled surveyor as its executive officer in road making; but a decided change is made by a classification of the roads. Disturnpiked roads, and such other important roads as seem really of county significance, are declared by the county authorities "main roads," and are to be supported

¹Act of 1862, § 20.

²Act of 1864, § 32.

one-half by the county, the other half being contributed by the localities. The same county authorities may reduce the status of a main road half supported by the county to that of an ordinary highway supported entirely by the parish. The county authorities are also given the power to direct the manner of keeping the accounts of the highway districts and parishes; of passing by-laws regulating the width of tire or wagon wheels, locking of wheels on hillsides, the opening of gates outwards on highway, the use of bicycles, etc.; all these provisions showing in the clearest manner the tendency toward centralization in road administration so as to make it more efficient.

Not less striking is the provision regarding the support of the local roads. Instead of the independent support of its own roads by each parish, the law of 1878 provides that "all expenses incurred by any highway board in maintaining and keeping in repair the highways of each parish within the district, and all other expenses legally incurred by such board, shall . . . be deemed to have been incurred for the common use or benefit of the several parishes within their district, and shall be charged on the district fund."¹

Any special extra expenses caused by exceptional circumstances such as differences of soil or locality, with the approval of the county authority, may be met by the part of the district especially concerned.

The provisions made by those two acts for the erection of highway districts did not at first meet with great popular favor, though as we shall see the government persevered in its policy. In the publi-

¹Highways and Locomotives Act, 1878, § 7.

cation of the Cobden Club for 1882, on Local Taxation, J. Roland Phillips says, that out of some 14,000 parishes about 8,000 have been created into districts, the number of districts being about 400.

The *state* assumed much of the expense of the road-making in matter of fact, though this does not appear in the law. "Since 1882, one-half of the expenses of the county authority, and also (during the years 1887-88) of the highway authority, has been refunded by a parliamentary grant out of the exchequer; so that, in fact, out of the whole expenses of the maintenance and repair of main roads, one-half has been found by the state, one-fourth by the highway authority and one-fourth by the county."¹ From 1882 to 1887, of course, the division would be one-fourth to the state, one-fourth to the county, one-half to the highway authority (district or parish).

By the Local Government Act of 1888 [§ 16], "every road in a county, which is for the time being a main road [within the meaning of the Act of 1878] shall . . . be *wholly* maintained and repaired by the council of the county in which the road is situate, and such council for the purpose of the maintenance, repair, improvement and enlargement of, and other dealing with such road, shall have the same powers and be subject to the same duties as a highway board." Some exceptions are made to the general provision at the request of the local authorities; but practically the full control and management of main roads in the hands of the county council, and the full burden of the support and responsibility for failure to keep in order rests on the county.

¹*County Councillors' Guide*, p. 24, note.

The ordinary local roads still remain in the control of the district and are supported by it, with such aid—if any—as may be granted from time to time by Act of Parliament (as in 1887–88) or by the county council.

It is a matter of some interest that Canada, as has been noted before, also gives its counties the right to assume the full management of the important roads in the country.

To the experience of the leading countries of Europe may well be added the opinions of some of the leading authorities on road making, to serve as a basis for legislation for the American State.

Sir H. Parnell in his “*Treatise on Roads*,” which the great road-maker, Telford, called “the most valuable treatise” that had appeared in England on the subject, considered that to the turnpike trusts were due the roads of England that were good. The management of the trusts he considered, however, very faulty, especially in the division of responsibility, there being sometimes as many as one hundred trustees. He recommended that an executive committee of five, with full power, be chosen by ballot, for three years. Before this committee the surveyor of the road should lay each year an estimate—with specifications—of the work to be done in the ensuing year, and the expense to be incurred. The committee would then determine what work should be done and what expense should be incurred. The chairman of the committee should have the sole direction of the works, should be empowered to give orders for paying for them, should appoint and discharge surveyors or laborers, and should call together the committee whenever it seemed advisable. He should receive

a salary, and make a full report of his work to the trustees at an annual meeting.

Parnell further thought it necessary for the production of any practical good in road making that the legislation be founded on a more enlarged view of the subject, adding that "it seems advisable that, instead of the governing authority of a parish, that of a county should be substituted, or when counties are very large that of a division of a county." His object, of course, was to secure efficiency of management by these changes; the matter of fairness in taxation being aside from his main purpose. It is worthy of note that all the later legislation of England has followed in the main the principles laid down by him, though the abolition of the trusts puts the management into the hands of the public.

Near the close of a treatise on "The Science of Road Making,"¹ awarded a first prize by the State Board of Agriculture of Massachusetts, Clemens Herschel, of Boston, presents a plan of legislation for that state which is very suggestive. Though the systems of Europe are discussed somewhat, the author considers them impracticable here, and his plan is one based upon the experience of London and Chicago with their "Boards of Public Works." He would have the state managed in road matters as those cities are in regard to public works. His plan includes a "State Board of Highways and Bridges," of three civil engineers, well-salaried, appointed by the Governor for three years each, one to retire each year. This Board keeps full records of its proceedings, works, expenditures, etc., and submits reports regularly to the legislature.

¹Printed in the *Engineering News* for 1877, a most excellent series of articles.

It is first to prepare and submit to the legislature a plan for the systematic classification of all the highways and townways in the state into two or more of the following classes :

(a). State roads, to be controlled and maintained wholly by the state.

(b). District roads, to be controlled and maintained by the state, but the expense thereof to be borne by the towns and cities of the districts in which said road shall lie, and the state, in such proportions as said Board shall apportion.

(c). Town roads to be controlled and maintained as now provided by law.

The construction of new roads, of the three classes above specified, to be done as follows :

(a). State roads, to be laid out and built by the state through the Board of Highways and Bridges.

(b). District roads, to be laid out, etc., by the County Commissioners as now provided, but the Board to have the final approval or disapproval of the proposed plans and profiles for said road, and also to have the charge and superintendence of their construction.

(c). Town roads, to be laid out and constructed as now provided by laws."

The payment of road taxes by labor, he thinks, should be abolished, and all road taxes be paid in cash.

The Board should further provide for the letting out of all contracts, should hire such engineers and assistants as might be needed or provided for, should regularly lay plans and estimates before the Legislature for fit legislation and appropriations, and should perform all other duties that would naturally belong

to such a body. The unessential features of the draft of the bill are, of course, omitted here.

Admirable as are many features of this plan, there are still some strong objections to be made to it, if the state is not a very small one. In the first place, the Board could not give personal supervision to the work, and in order to have it effectively done would need to employ scores, even hundreds of assistant engineers, to say nothing of thousands of laborers. These, scattered over a large state could not be well controlled. It would seem better to have these many engineers each responsible to somebody near at hand. The real functions of such a State Board would seem to be rather to make specifications, plans, etc., regarding the making of roads, to collect facts, and statistics, and publish information that would be valuable to the practical working engineers, to prepare plans and estimates for legislation, etc. Again, from the economic standpoint, it seems that, in great measure, the railroads, and they alone, are really of state significance, and that consequently but few roads if any should be supported directly from the state treasury. This is, of course, a matter of detail, and would vary much in different states.

VI.

SUGGESTIONS FOR ROAD LEGISLATION.

It seems fit in conclusion to sketch briefly some of the leading provisions that, judging from the foregoing discussion, should be embodied in amendments to the present systems of road legislation in our states.

1. Toll roads should generally be abolished as soon as a due regard for the rights of the corpora-

tions permits. In the newer states, if in places toll roads seem almost necessary, provision should be made for their early surrender to the public. It will in nearly all cases be found that by proper legislation, larger tracts of territory being placed under one management, toll roads may be better dispensed with from the beginning. If suitable legislation cannot be secured, toll roads may be better than none.

2. The roads should be carefully classified with reference to their relative importance. In most states fairly well settled there should probably be three classes, though in many cases two would suffice.

(a.) Roads of the first class, main roads connecting large towns in the same or adjoining counties or those much used for long distance traffic, should be controlled solely by the county authorities and supported by county funds. So far as such a road served in part of its length as a local road the town benefited thus might contribute to its support.

(b.) Roads of the second class, those connecting roads of the first class or serving as principal feeders to them, also those serving as connecting roads for two or more townships, should be supported mostly by the towns in proportion to the benefits received, aid being given by the county in case of special expense, such as the building of a costly bridge, or in case of real inability to pay on the part of the town. The management of these roads, details of working, etc., should be in the hands of the county authority.

(c.) The roads of the third class, merely local roads, should be supported by the town and managed by town officials.

3. The county Board of Supervisors (or corresponding county authority) should classify the roads, should determine the amount to be expended on roads of the first class, and where it should be expended, the amount to be granted in aid to the township, and should make any special regulations that seem necessary—not provided by state authority—for the building and management of the road.

4. The county board should hire on a salary a civil engineer (with assistants if they seem necessary), who should have the general supervision of all roads of the first and second classes in the county. At the fall meeting of the board it would be his duty to lay before them a detailed statement of all the work done on such roads during the preceding year; also a detailed plan of the work that it might seem advisable to do on the roads of these two classes during the year to come, with a careful estimate of the cost, and an opinion as to the proportion of the expense that should be borne by the county and by the several towns directly concerned. At the beginning of such a system he should suggest the proper classification of the roads, and thereafter he should recommend any change in the classification that seemed desirable on account of the increase in population, changes in traffic made by railroads or other cause. The plans for all important bridges should be made by him; he should lay out, under the direction of the supervisors, and perhaps at times with the aid of town authorities, all new roads; and all repairs of roads should be made according to his instructions. The county engineer could probably act also in many cases as county surveyor. At any rate, he should prepare topographical maps of the county,

to be kept in his office, and should fix bench marks showing the grades on all the important roads in the county.

5. The county should be divided by the Board of Supervisors (or corresponding county authority) into a suitable number of road districts. Probably for convenience in administration, these districts should correspond with the townships, including one or more according to the population and the length and character of the roads. It might be advisable in some cases for these districts to follow certain lines of roads instead of including a certain territory, but it would probably be best, in most instances at least, to bound by town lines. The districts should be large enough to keep at least two men busy the whole year, whenever the weather would permit work on the roads, with a team whenever it could be used to advantage. Of course, in well settled districts, more men should often be employed.

6. For each road district there should be appointed, preferably by the county engineer and the local authorities—say the town supervisor and town clerk—a road commissioner for the district. This commissioner should work the roads of the first and second classes in his district directly in accordance with the instructions of the county engineer, making to him full reports of all work done, and having this work approved by the county engineer.

In case of local roads, the commissioner should act within his district as does the county engineer for the county, making plans for the roads, reports to the town authorities of the work done, estimates of needed improvements, etc. The town authorities should then levy such taxes upon the town as seemed to them suitable.

7. Minor repairs to the roads, such as filling holes, opening drains, clearing ditches, cutting weeds, etc., should, of course, be done from day to day by the regular workmen, as needed. Important repairs and building of permanent improvements should be made at the time best adapted for such work, either by contract, at the will of the county or town board, or by the engineer or commissioners, who would hire suitable help.

8. The system of highway labor should be abolished, unless it be in the case of a certain rate above the ordinary limit. Such extra taxes might be worked out oftentimes to advantage, especially if teams could be largely utilized.

9. Provision should be made for borrowing money under strict conditions, to make permanent roads; and it might be wise in some states for the state to grant subsidies for this purpose.

10. A state engineer—or, perhaps better, a state board of engineers of three, one retiring each year—should be appointed, with general supervisory powers. Such a board should have charge of any state roads that might be established—and in many places roads may be found that are really of state significance, and should be classed accordingly, though, in general, the railroads are the only ones of so great importance. To this board yearly reports should be made by the county engineers, of the amount and character of the work done by them, with the apparent results.

A general report should then be prepared and published, containing all important statistics and information that would be helpful to the engineers. The state board could also do very much to further

the work of the county engineers by holding meetings with them from time to time, at which questions of importance could be discussed. Such a board should also prepare regulations regarding the manner of making roads of different classes—as to width, grade, etc., and also regarding the general law of the road. It would be within its province also to suggest improvements in legislation if any were required, and to do all in its power to make all the roads in the state, so far as possible, parts of one system.

Of course in setting forth the defects of our present systems of road laws, with a brief account of the systems in other countries, and a slight sketch of what seems a possible improvement in our legislation, only the essential features have been touched. There is no reason why the details of appropriating land for a road, of determining when, and to a certain extent, where a new road should be built, the collection and paying out of taxes, etc., should not be, in the main, as now, with lesser modifications made necessary by new officers. Only the essentials of a plan have been given, and the details might be filled in in a dozen ways without materially altering them. So, again, there might be various modifications of the plan given that would not affect it materially; but it is believed that no system can succeed that does not make provision, at least, (1) for some classification that will ensure the application of means where they are needed, and especially (2) that does not secure skilled roadmakers to supervise the work.

The common objection of an increase of expense,

higher rates of taxation, etc., is always made to any plan which proposes the employment of salaried officials; but if the estimates given in the first section of the present waste of road funds is anywhere nearly correct, no better way could be devised for lessening expenses.

In large sections of our country, too, our people are convinced that from lack of stone or gravel, good roads are, under any system of legislation, an impossibility; but if we may judge by the experience of Europe, and the opinions of road engineers in both Europe and our own country, any system that will classify our roads and put them under the care of skilled engineers, will both lessen the expense and, by the application of methods even now well understood by experienced men everywhere, will give us in all parts of our country good roads.

APPENDIX I.

THE ROAD LAWS OF FRANCE.

It has seemed advisable to give a somewhat complete sketch of the road laws of France. The admirable summary of the laws given by Mr. Waddington in his article on "Local Government and County Councils in France," published in the *Nineteenth Century* for June, 1888, makes any attempt at condensing the law needless. This summary is taken *verbatim* from that article.

Mr. Waddington has been writing in the earlier part of his article of the County Councils (*Conseils généraux*) and then continues as follows :

Their most important function is the management and maintenance of the wonderful network of roads of different classes which is spread all over France, and which, I have no hesitation in saying, is superior to everything of the kind I have seen, either in England or on the Continent.

All over France the roads are divided, according to their importance, into the following categories :

1. *Routes Nationales*.—These are the great highways which lead from Paris to different points of the frontier, or which join the great provincial towns, such as Lyons and Bordeaux, or, again, which connect the different fortified towns along the frontier. At the beginning of the century these highroads were almost the only ones which were kept in good repair, and for many years they were the main

arteries of traffic and travel all over France. But since the establishment of railways, which generally run parallel to them, they are much less used, and in some places I have seen the grass beginning to grow upon them; they are, however, still kept in good order all over the country. This class of roads is entirely maintained by the State, and is under the management of State engineers, “*ingénieurs des ponts et chaussées*,” whose chief is the Minister of Public Works.

2. *Routes Départementales*.—These connect the different towns of a department with each other and with the towns of the neighboring departments. They are not quite so broad as the ‘*Routes Nationales*,’ but are kept in admirable order, and bear more traffic than any other class of roads. They are maintained entirely out of the funds of the department, or, as would be said in England, out of the county rates; they are under the direct management of the *conseil général*.

3. *Chemins de Grande Communication*.—These are considered as nearly equivalent to the ‘*Routes Départementales*,’ but are almost all of more modern construction; in most cases they were only begun when the network of the ‘*Routes Départementales*’ was completed. In many departments the ‘*Routes Départementales*’ and the ‘*Chemins de grande Communication*’ have been completely amalgamated; in others they are still managed by different staffs, but always under the authority of the *conseil général*. The original difference between the two sets of roads was mainly that whereas the ‘*Routes Départementales*’ were maintained entirely out of the county rates and managed by State engineers, the ‘*Chemins de grande*

Communication' were constructed and kept up partly out of the county funds, partly out of the contributions of the different parishes interested, and managed by county officials.

4. *Chemins d'Intérêt Commun*.—These are country roads, of less width and less solid construction than the preceding, and connecting together the principal villages of a canton with each other and with their 'chef-lieu,' or with that of a neighboring canton. They have been generally made up out of old village roads, which have been repaired, widened and straightened under the direction of the county officers; they are of the greatest use for the local circulation, and it is always an object of ambition for a country parish to get one of its village roads comprised in a 'ligne d'intérêt commun.' These roads are mainly kept up out of parochial contributions, but the county gives considerable help, in the form of annual grants, which are variable, and are voted every year.

5. *Chemins Vicinaux Ordinaires*.—These are the purely parochial roads, connecting together one village with another, or the different hamlets of one parish. They are maintained out of the resources of the "commune," but in the case of the poorer parishes, when a new road is to be constructed, both the State and the county contribute a certain grant in aid, which is distributed according to certain fixed rules. Before obtaining any external aid, the 'commune' must undertake to maintain the road, once it is completed, out of its own funds, and must furnish proof that it is able to do so. Parish roads are under the supervision of the mayors of the communes; but the county officials always lend their assistance or

advice when required, and draw up the plans for the construction of new roads.

The supervision, the repairing of all these roads, and the construction of new ones, require, of course, a considerable staff of officials, which the 'conseils généraux' are free to organize as they think fit. In some departments the old "Routes Départementales" have been left in the hands of the engineers of the State (Ponts et Chaussées), whereas the other roads are confided to a local staff, called 'service vicinal.' In other cases, the whole of the roads are managed by the engineers of the Ponts et Chaussées, who receive on that account a special indemnity or extra pay from the department. But in most cases, as far as I am aware, the 'conseils généraux' have entrusted the whole network of county roads, great and small, to their own officials of the 'service vicinal,' paid entirely out of the county budget, and under the direct control of the county representatives, who could stop their pay if they had any serious cause of complaint.

At the head of the 'service vicinal' is the 'agent voyer en chef,' who is sometimes an engineer who has left the service of the State for that of the department, sometimes a man who has distinguished himself in the 'service vicinal.'^a Under him there are several 'agents voyers d'arrondissement,' and in each canton one or two 'agents voyers cantonaux,' according to the size and importance of the canton. These latter agents have under their orders a large number of 'cantonniers,' who are attached permanently to the different roads and execute all the current minor repairs; when these are not sufficient, other workmen are engaged temporarily. In

the rural districts these 'cantonniers' are generally allowed a month's holiday at harvest-time and are able thereby to eke out considerably their rather scanty pay. The 'agents voyers' now form a considerable body of skilled men all over France; they are regularly trained in the art of constructing and repairing roads, of making the best use of the very variable materials at their disposal; their methods are embodied in regular handbooks, and all questions connected with their profession are discussed in a monthly review; many of them have become excellent practical engineers.

The next point to be considered is the nature and origin of the financial resources, by means of which the network of roads is so admirably kept up. . . .

The following are the principle items which make up the 'budget des routes et chemins:' 1. The 'Prestations en nature,' which I will describe in detail presently; 2. 'Subventions Industrielles,' paid by manufacturers and others who subject the road to special wear and tear; 3. A large contribution from the general county rates, or 'centimes additionnels,' of which I shall speak hereafter.

I will first explain the system of the 'Prestations.' Every rate-payer, except such as are exempted by the 'conseil municipal,' is bound to furnish, for the repairing and maintenance of the roads in his parish or in the immediate vicinity, three days' labor, which are called 'journées de prestation;' and, further, three days' work of all horses, donkeys, mules, draught oxen, and carts in his possession, and of the servants or permanent labourers in his employment. The poorer ratepayers often perform their three days' work in person; the farmers and some land-owners

send their horses and carts with men to quarry, load or unload the earth or stones which have to be carted; this is the real 'prestation en nature,' that is, a contribution *in kind* as distinguished from contributions in money. But in practice a large proportion of the 'prestations' are redeemed, according to a moderate tariff which is voted every year by the conseil général, and are converted into money payments. The tariff varies of course in different parts of France. In my own department, the Aisne, which is a rich one with large manufacturing and agricultural interests, the day's labour of a man can be commuted for two francs, or 1 s. 8 d., the day of a horse or draught ox for three francs and a quarter, or 2 s. 8 d., and the rest in proportion. In prosperous years there is always an increase in the money payments, whereas in years of depression there is invariably more labour in kind and less commutation; therefore the results of the 'prestations' afford in a certain measure a test of the local prosperity. Generally speaking, it is the interest of the country that a large proportion of the manual labour should be commuted for money, because the regular paid labourers do more and better work than the casual workmen who come to acquit themselves of their 'prestations.' On the other hand, the more carting is done by the 'prestataires' the better for the county finances, for it is cheaper than hired carting, and in some districts the latter is difficult to obtain in sufficient quantity. The 'prestations,' besides being redeemable in money, may be converted into piece-work. For instance, a farmer, or an association of several farmers, may engage to cart away a certain quantity of earth when a road is being widened, or they may undertake to furnish a

given quantity of stones along a certain stretch of road ; and this is often done, because the operation is advantageous both for the 'agents voyers' and for the farmers, the former having merely to verify the quantity of road stuff delivered instead of superintending the daily work, while the latter can choose their own time and do their carting when their cattle and wagons are not required for the work of the farm.

The 'prestations' are executed under the direction of the 'agent voyers cantonaux,' who assign to each parish the task it has to perform, and the particular roads and sections of roads on which the work must be done. This is sometimes a delicate duty, for the 'prestataires' naturally object to going any distance from their villages, whereas materials in many cases must be fetched from quarries situated some miles off, or repairs must be carried out on roads which run through a neighbouring parish. In these cases it is for the 'agent voyer' to decide what work will be best performed by hired labor, and what can be fairly assigned to the 'prestataires.' When a parish thinks that it has been unfairly treated, it can appeal for redress to the conseil général, whose decision is final. In all contracts entered into by the 'service vicinal' for the regular keeping up the roads, the portion to be paid in money and the portion to be executed by the 'prestataires' are always clearly specified. In order to mark the importance of the 'prestations' I may state that in my department they represent rather more than half of the total expenditure on the roads maintained by the 'conseil général,' and this is not all, for some of the 'prestations' are employed on the 'chemins vicinaux ordinaires,' or purely parochial roads.

The 'subventions industrielles' are an important element in the road-budget, at least in the manufacturing districts. They are levied on the principle that certain industries and manufactures which make use of large wagons and cart very heavy loads cause an abnormal wear and tear of the roads, the repairing of which cannot be fairly charged on the general body of rate payers. This is particularly the case with sugar factories, distilleries, and other industries, whose chief period of activity is in the autumn and winter, when the roads are wet and peculiarly liable to be cut up by heavy traffic. The amount of the 'subvention' is debated between the 'agents-voyers' and the parties interested, and a fair arrangement is generally agreed upon under the sanction of the conseil général; but if the parties cannot agree, the matter is referred to the 'conseil de préfecture,' or administrative tribunal, with whom the final decision lies. The 'subvention industrielle' must always be spent on certain specified roads or sections of roads, and cannot be applied indiscriminately to the general purposes of the 'service vicinal.' Some manufacturers prefer contracting for the keeping up the roads they use, and these arrangements must also be sanctioned by the 'conseil général' or its permanent committee.

Besides the 'prestations' and the 'subventions industrielles' there are some other minor sources of revenue which belong to the road-budget; for instance, the sale of the trees planted along the roads and the tolls paid at ferries; but these are of small importance.

A special budget for the roads is prepared every year by the 'agent voyer en chef,' and laid before

the 'conseil général.' It is divided into two sections, the first comprising all the ordinary annual repairs; the second relating to the reconstruction of old and ill-constructed sections, the straightening of sharp curves, the lowering of steep gradients, or the construction of entirely new roads; the last mentioned case is not, however, now of frequent occurrence, at any rate in the wealthier departments.

The budget is presented in the following simple shape: First comes the estimate of the cost of all the ordinary repairs for the ensuing year; from this total is deducted the estimated value of the 'prestations en nature' and of the 'subventions industrielles,' which do not vary much from year to year, and the balance of the expenditure is covered by a large contribution from the general county rates.

This contribution is voted separately, and then becomes one of the items of the general budget of the department. The second portion of the budget, relating to new work or exceptional repairs and alterations, is established on a rather different basis; in this case the 'prestations,' and the 'subventions industrielles' are not applicable, for they are reserved by law for the ordinary repairs and maintenance ('entretien') of the roads. Instead of this resource we find the voluntary contributions of the 'communes' and of individuals, without which the department now-a-days seldom undertakes to carry out any new work or expensive alteration. The balance of the expenditure is provided for out of ordinary or special county rates and out of the proceeds of loans which have been duly authorized for that purpose. In all cases where alterations of old roads or the construction of new ones are demanded by 'communes' or

parishes, they are obliged to indemnify the owners for the new land that must be taken up ; where the land is cut up into small holdings this is a very serious charge on the parish rates ; but where it belongs to middle-class or large proprietors it is almost always given up gratuitously.

The ‘chemins vicinaux ordinaires,’ or strictly parochial roads, do not properly come within the sphere of action of the “conseils généraux,” because they are entirely maintained out of the parochial rates and out of that portion of the ‘prestations’ which is reserved for parochial uses. It is only in the case of new parochial roads that the conseil général and the state give grants in aid, in proportion to the poverty of the parish on the one hand, and to the sacrifices made by the parish and the gifts of individuals on the other. For instance, if a landowner makes a free gift of all the land required for a new road, and if the parish votes even a small rate, both the state and the department, or at any rate the latter, will come to their assistance.

The last section of the road-budget comprises the salaries and indemnities of the agents, office expenses and pensions. Such is the organization of the “service vicinal” in a French department ; it is a very simple and effective one, and has produced admirable results.